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Farm wetlands boost drought resilience, productivity and biodiversity

- Farmers (and the catchments they farm on) stand to **benefit significantly** from restoring or maintaining wetlands on their properties – from increased drought resilience, better stock and soil health to more productive and biodiverse landscapes.
- Wetlands **improve farms** as they clean and filter water, reduce run-off, protect against drought, cycle nutrients, assist with pest control, increase wildlife and plant diversity, and store more carbon.
- You can immediately and directly take **practical steps** to protect and restore your property’s wetlands and farm dams – and this brochure explains why and where you can find resources and assistance to do this.

The brochure firstly discusses the benefits of wetlands for farming resilience, productivity and biodiversity. It then provides initial information on steps for 1) restoring or managing natural wetlands on farms, and 2) rewilding farm dams.

Healthy wetlands increase farming resilience, especially to drought

Farmers across the Murray-Darling Basin recognise the benefits from maintaining and restoring wetlands on their properties.

The benefits extend from your own farm to the whole catchment.

A restored, protected and well-managed wetland makes your farm more resilient to drought by:

- storing water which is available during droughts (which are predicted to increase with climate change)
- creating a moisture-rich microclimate; water vapour evaporating from wetlands creates moist air and dew which means plants are healthier and soil is more likely to retain moisture
- holding more plant matter (soil carbon), which increases soil moisture.



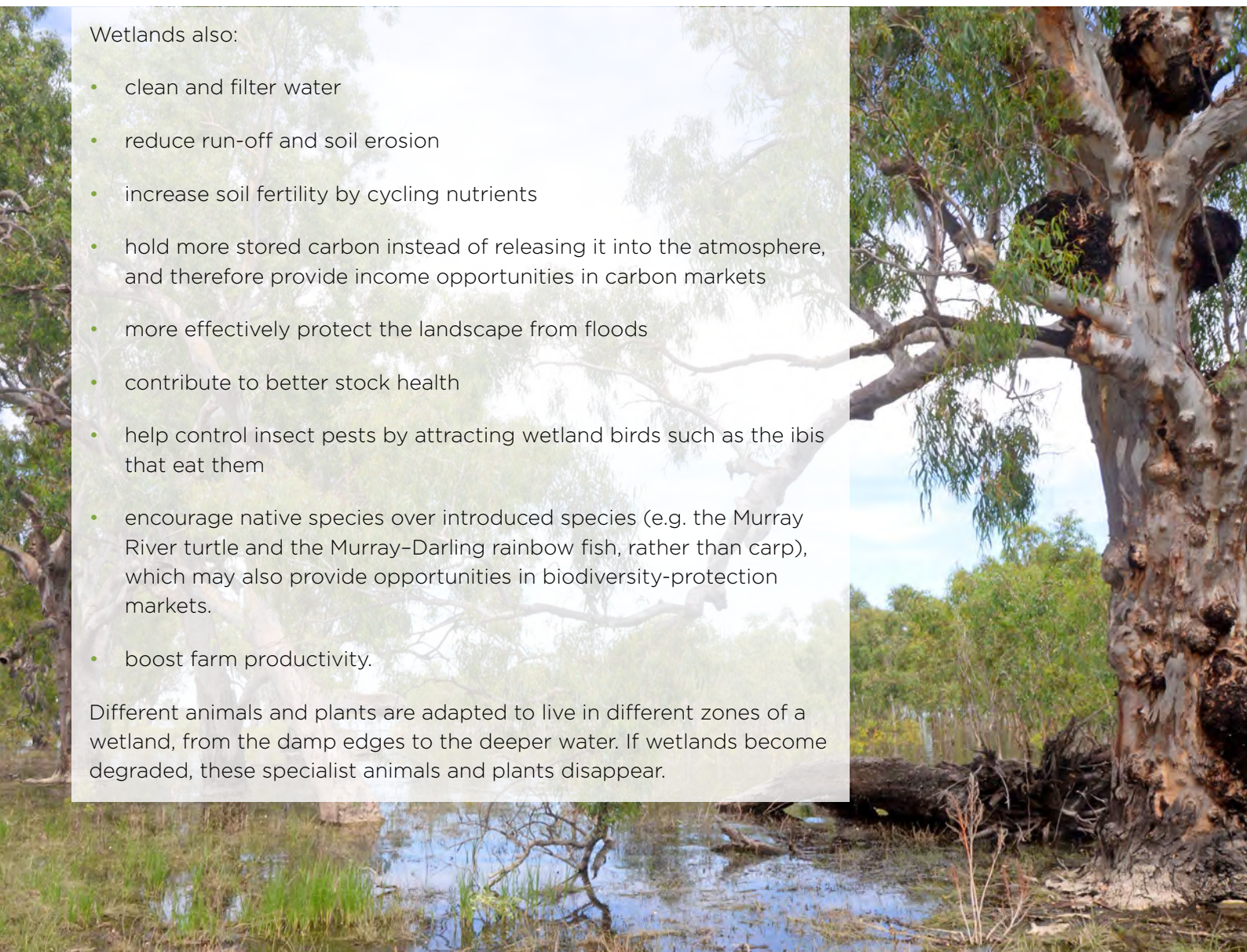
Bradley Haw, who runs sheep on his farm on the Loddon River Floodplain in northern Victoria

“Restoring wetlands is a strategic investment in the resilience of our farms and the prosperity of our communities: witnessing the resurgence of native wetland vegetation on our land isn’t just an environment win.”

Wetlands also:

- clean and filter water
- reduce run-off and soil erosion
- increase soil fertility by cycling nutrients
- hold more stored carbon instead of releasing it into the atmosphere, and therefore provide income opportunities in carbon markets
- more effectively protect the landscape from floods
- contribute to better stock health
- help control insect pests by attracting wetland birds such as the ibis that eat them
- encourage native species over introduced species (e.g. the Murray River turtle and the Murray-Darling rainbow fish, rather than carp), which may also provide opportunities in biodiversity-protection markets.
- boost farm productivity.

Different animals and plants are adapted to live in different zones of a wetland, from the damp edges to the deeper water. If wetlands become degraded, these specialist animals and plants disappear.



Wetlands protect from drought and floods

In 2023 the Wetland Revival Trust implemented a successful wetland-restoration project on the farm of Bradley and Karen Haw that was funded by the Australian Government's Future Drought Fund. This work complemented the protection of remnant native vegetation the Haw family had been working on for years. Following the restoration, the Haws have observed significant benefits, including improved water availability during droughts and protection from flood run-off.

"I can get quite wet walking through the grass in the morning with dew, but my next-door neighbours haven't got dew at all. I'm starting ... my own little water cycle and changing the microclimate on our own block, and that excites me.

I haven't had run-off off my farm for years. I had no water leave my farm [during the flooding event October 2022]. I had lots of water come onto it, but my paddocks soaked it all up and it's just healthier."

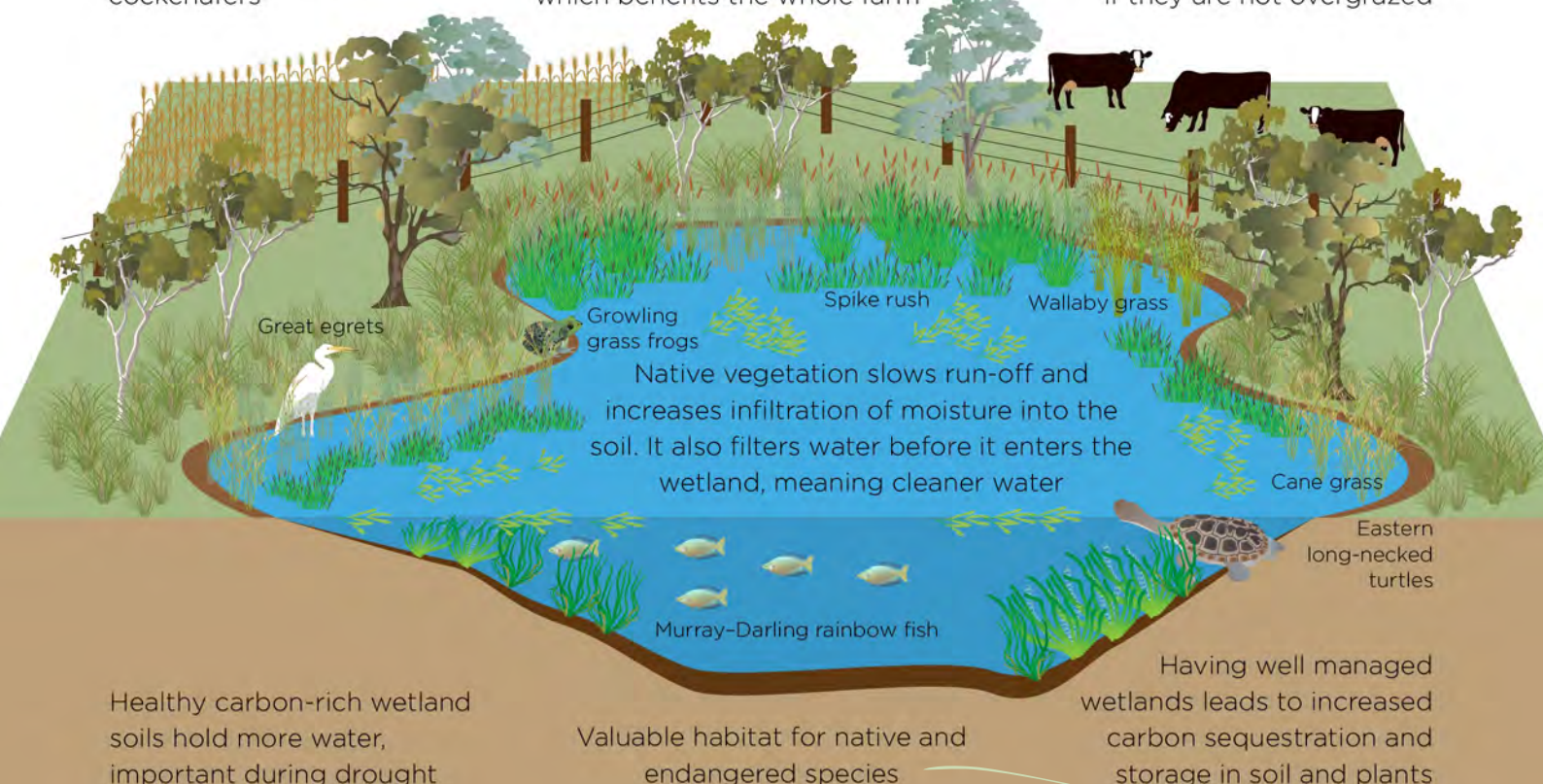


Wetlands on farm provide benefits to farmers and their ecosystems

Wetland birds such as ibis eat agricultural pests including crickets and cockchafers

Increased air moisture from wetland evaporation and transpiration meaning healthier soil and plants, which benefits the whole farm

Native plants can replace invasive weeds and provide important fodder during drought if they are not overgrazed



Restoring flows and vegetation on farms

Farm wetlands need protection and restoration

Farms can contain many types of wetlands, some of which may be dry nine years out of 10.

Wetlands are areas where water covers or saturates the soil for all or part of the year. This includes swamps, marshes, billabongs, lakes, lagoons, estuaries, mudflats and water reservoirs.

Wetlands on farms include natural areas such as shallow grassy meadows and marshes, and tree-covered swamps; and even constructed wetlands including farm dams, irrigation drainage lines, ponds and other water-storage areas.

Most wetlands in Victoria (80%) are shallow wetlands found on private land, including farms. The majority of these (> 60%) are in moderate to very poor health. The (approximately) 35,000 naturally occurring wetlands in Victoria currently cover more than 1.8 million ha. Without protection and careful management, more of these wetlands could be lost.

"I think there's a real opportunity. A lot of farmers have a wetland that they really haven't got much use for. My sister has an area of land that she tried to crop and tried to graze, but it just never did anything. It's a depression that gets sort of boggy, But [such areas] are the ugly ducklings that can be turned into beautiful swans [with wetland restoration]."

Jo Bear

This shallow grassy wetland meadow on a farm in northern Victoria supports an endangered community of plants and animals. However, ploughing during dry periods can destroy wetlands like this.



Wetlands need natural wetting and drying cycles

Many wetlands in Australia have a natural wetting and drying cycle – and the dry phases are just as important as the wet for the animals and plants depending on them.

Wetland plants and animals have adapted to local weather extremes – where wetlands generally fill up with water in winter and spring, and dry out in summer and autumn. However, occasionally summer thunderstorms also fill wetlands. Wetlands on farms, including those that receive environmental water, should function to mimic the natural local wetting and drying cycle.

Some wetlands remain dry from six months to several years. However, many wetland plants can survive below the surface between wet periods. For example, water ribbon tubers can survive in dry soil for decades, as can the seeds of aquatic plants and the spores of algae. During dry periods, on the surface, land plants move in and replace the aquatic plants.

Some aquatic animals can also survive dry periods: frogs may burrow into deep cracks in the soil, turtles and water birds will move to more permanent wetlands, and the eggs of invertebrates such as fairy shrimp and seed shrimp can survive for very long periods in dry soil.

Once a wetland starts to fill again with water, invertebrate eggs hatch. Aquatic plant roots and rhizomes (horizontal underground plant stems) rapidly sprout stems and leaves, and their seeds germinate and grow quickly. At the same time, land plants die off – creating a rich source of nutrients for fungi and aquatic microorganisms to break down. When the wetland is full of water, it attracts even more animals – especially birds and frogs.

Farming activities impact on-farm wetlands

The health of on-farm wetlands can be degraded by:

- draining the wetland
- altering the frequency, duration and extent of natural water flow on farms (e.g. through levees, dams or other river regulation)
- cropping wetlands during dry periods
- converting wetlands into cultivated land
- using pesticides and fertilisers, increasing pollutants and nutrients
- using heavy machinery or allowing stock to graze when soils are wet and vulnerable to pugging
- overgrazing wetlands, especially when wet
- climate change increasing the frequency and intensity of droughts.

On-farm wetlands do not stand alone. They are part of a river catchment, and their health reflects how people, their use of water and land, and the landscape interact.



You can protect and restore wetlands on-farm

There are four main steps you can take to protect and restore natural wetlands on your property:

1. Assess your property and identify existing and drained or degraded wetland areas that can be restored.
2. Develop action plans for protecting and reviving natural wetlands. You may need some assistance from a wetland ecologist.
3. Act to protect and revive wetlands: e.g. fencing, planting, weeding, water delivery, and restoring natural wetting and drying.
4. Monitor and manage your wetlands to ensure they stay healthy.

Wetland before restoration on Bradley Haw's property at Yando

When Bradley Haw first got to his property, he found only black box trees with overgrazed pastures and few native grasses or shrubs. Lots of fallen timber, important wildlife habitat, had been taken for firewood.

In January 2023, the Haw's wetland:

- was cut off from its natural source of water and rarely flooded
- had dry, hard and compacted soil
- had sparse understorey vegetation and leaf litter
- provided limited habitat for woodland animals.



Haw's wetlands prior to water delivery and revegetation by the Wetland Revival Trust in January 2023

Healthy wetlands mean more feed for livestock

In response, Bradley replanted native grasses and shrubs and controlled his sheep grazing. He also put back more than 400 tonnes of black box hollow logs.

"I've planted native plants that are really high in protein and nutrients for the sheep and just move them around. I've got feed all the time and they do really, really well."

Bradley grazes his 80 sheep on 30 acres of old-man saltbush paddock, that he has thickened up with native grasses and wattle, negating the need to irrigate his paddocks for pasture.

"It's an irrigation farm, but I don't irrigate anything anymore, and I'm running just as many sheep or more sheep than most people who are irrigating pastures."

There's a whole diversity of plants out there that are using water from different levels in the soil profile.

I can stick my shovel into the soil full depth any time of the year. The soil's just soft and pliable and healthy; I get the dew and a little shower of rain, and then it's instantly green. And I know in 12 months' time how much feed I'm going to have."

To restore wetlands you need to:

- Minimise pesticide and fertiliser use by considering integrated pest management, conservation tillage and/or organic farming.
- Minimise run-off of any pesticides and fertilisers by establishing a minimum 50 metre-wide native vegetation buffer between crops and wetlands.
- Control pests such as carp, rabbits, foxes, pigs and weeds.
- Retain and plant local native trees and plants, particularly in wetlands and along watercourses (find a similar natural, ecologically healthy wetland nearby and find out what native plants are growing there).
- Reduce disturbance of the land around wetlands; for example, by heavy machinery or stock movements.
- Provide stock watering points outside the wetlands area; for example, with troughs.

- Fence off wetlands to control livestock access. Grazing can be used for weed control in wetlands, but only when they are dry.
- Allow wetlands to undergo their natural wetting and drying cycle to maintain natural hydrology (i.e. do not drain wetlands or stop them from overflowing).

When inundated, the wetland provides habitat for a diverse range of wetland fauna including frogs, water bugs and wetland birds.

The same wetland on the Haw's farm at Yandoo in December 2023 after restoration by the Wetland Revival Trust

Making farm dams more productive and environmentally friendly

Improving farm dams can have significant impacts. Most farm dams have little to no habitat value for native wildlife, but are still crucial sources of water during droughts, and can support sustainable farming and biodiversity aims.

If dams can be designed or converted to emulate natural wetlands ('rewilding') while still providing water for farm activities, they can support a diverse range of common and threatened wetland animals and plants.

Ecologically healthy farm dams:

- provide better quality water for stock, crop irrigation and gardens
- increase productivity and property values
- improve water retention and soil health
- have diverse habitats for wildlife
- provide water for fire management and protection
- emit less methane when fenced, reducing fertiliser and manure run-off
- can be used for recreation.

By simply fencing off a farm dam and excluding stock, water quality increases dramatically with **30-40% less dissolved nitrogen and phosphorus, 22% more oxygen, less turbidity and less disease-causing organisms**. With improved water quality, livestock are healthier and can gain up to **23% more weight**.

“You’d be hard pressed to find a better investment for a farm than making small improvements to their dams. Simple improvements such as fencing and installing watering points enhance production, drought resilience, animal welfare and biodiversity. Studies show that with cleaner water, [grazing] animals increase their weight by around a quarter.”

Professor David Lindenmayer,
Australian National University

A constructed wetland prior to planting in January 2022 (left) and the same wetland after revegetation less than 18 months later (right)



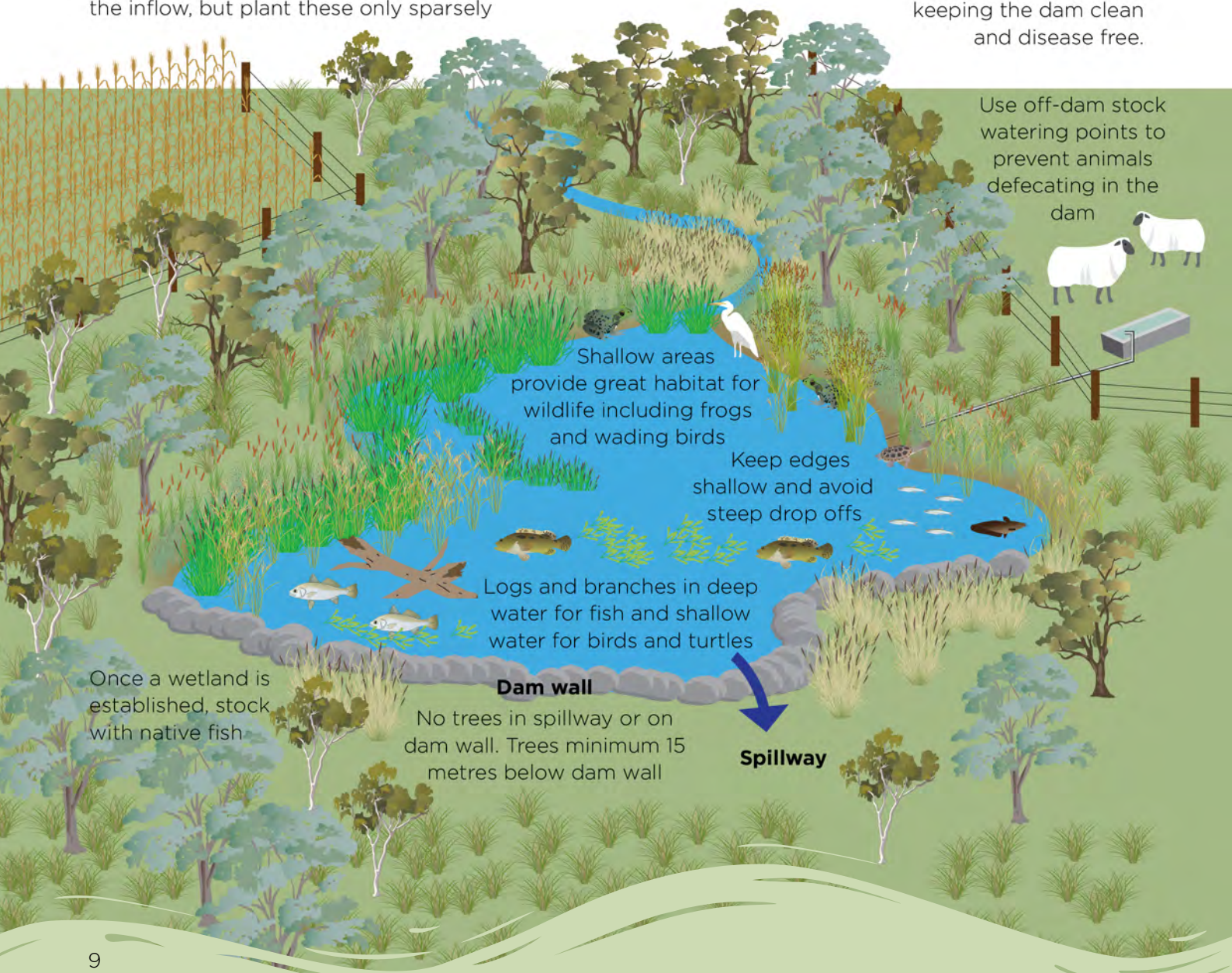
Rewilding a dam

1. Reshape the sides to reduce steep edges and create sloped edges or benches where native vegetation can be established.
2. Fence the dam from stock to increase water quality, increase animal health, and reduce methane emissions and dissolved nitrogen and phosphorus (which increase with decomposing livestock faeces in water).
3. Establish wetland plants in the water to increase diversity, create local native habitats and shade, and reduce water temperature and evaporation.
4. Plant a buffer of native plants around the dam including in the drainage lines and depressions that flow into the dam to stop soil, nutrients, animal droppings and other pollutants reaching the dam during rain.
5. Introduce native fish once the dam's habitats have been established.
6. Find more actions to take on www.sustainablefarms.org.au/on-the-farm/farm-dams or seek advice from your local catchment authority for funding and suppliers.

Main inflow

Dense grasses will filter water at inflow point, Trees and shrubs can help stabilise the inflow, but plant these only sparsely

Provide livestock water by piping to a trough, keeping the dam clean and disease free.



Planting and protecting native vegetation

Healthy vegetation throughout and beside any type of wetland is the key to gaining the benefits from wetlands.

You should select native plants, in collaboration with advice from a wetland ecologist or your local catchment authority, based on:

- those that thrive in nearby intact wetlands with similar environmental characteristics
- their ability to withstand extreme rather than average conditions; for example, their ability to withstand higher salinity levels as the wetland dries
- their ability to colonise bare areas and make such areas suitable for other plants in a process of natural succession
- their ability to suppress weeds and take up nutrients; e.g. the giant rush *Juncus ingens*, which is also good at controlling erosion, and the tall spike-rush *Eleocharis sphacelata*.

Wetlands need different plants that are adapted to the different conditions of a wetland, from deep water to the edges, for them to be healthy. Here are some typical plants found in different wetland zones.

The best times and places to plant are:

- plants on the edges grow best when it is cool and there is plenty of moisture available
- plants in deeper areas grow more rapidly when it's warm and are best planted when water levels are low.

You can protect plants from birds during their first growing season using netting or small-gauge bird wire.



The Bear's red gum wetland prior to restoration, January 2023

Sedges and grasses, e.g. tall sedge (*Carex tereticaulis*) and brown backed wallaby-grass (*Rytidosperma duttoniana*)

Emergent plants, e.g. tall spike rush (*Eleocharis sphacelata*) and common spike sedge (*Eleocharis acuta*)

Emergent plants, e.g. river club sedge (*Schoenoplectus tabernaemontani*), tall flat-sedge (*Cyperus exaltatus*)

Mudflat colonists, e.g. old man weed (*Centipeda cunninghamii*)

Floating attached plants like water ribbon (*Triglochin procerum*)

Submerged plants, e.g. ribbon weed (*Vallisneria australis*), and blunt pondweed (*Potamogeton ochreatus*)

Jo and Greg Bear's property is located on the Loddon River floodplain, which historically would have flooded every few years, leaving chains of interconnected wetlands. These wetlands would have offered important refuge sites for wildlife.

After working with the Wetland Revival Trust (funded through the Future Drought Fund) to restore their natural wetlands, Jo says: *"The environment becomes softer, lusher, more tranquil; this certainly assist with increased plant growth and diversity, but it is also good for the soul. It provides a positive mental wellbeing and we have no doubt it is also a refuge for our sheep, especially in drought conditions."*



The Bear's red gum wetland less than a year later, after delivery of environmental water and re-vegetation by the Wetland Revival Trust, December 2023



"Our holistic approach is rooted in the belief that 'if you look after nature, nature will look after you.'"

Get help from the Wetland Revival Trust

The Wetland Revival Trust (WRT) is a not-for-profit environmental charity with decades of expertise in wetland restoration



on public and private land. WRT aims to protect, enhance and restore wetlands in the southern Murray-Darling Basin. Working with private landowners to protect, restore and enhance wetlands on private land is critical.

A recent project restored eight wetlands on local farms in northern Victoria, called 'Boosting drought resilience in the Lower Loddon Landscape', as part of a project funded by the Australian Government Drought Fund. The results of this project were monitored by the Blue Carbon Lab and Authur Rylah Institute to demonstrate improvement to carbon sequestration, better plant establishment and soil health, and improved resilience to drought. WRT seeks to expand this project by working with other farmers and landholders to restore and protect their wetlands.

If you would like to express interest in having your wetland assessed for potential restoration or would like to help fund WRT's wetland restoration targets [please contact us at WRT's website](#).

Reflecting on her work with the Wetland Revival Trust, Jo Bear says: *"It's been exciting to gain knowledge about how to work [to restore the wetlands] ... in our area, this area is known for wetlands and lakes and rivers and creeks, so I think every farmer has probably got sort of a little mini wetland or a lake that they'd like to do something with. I think everyone just wants to learn more about it."*



Local First Nations work crew planting at the Bear's wetland



Scientifically measured outcomes

This project partnered with leading vegetation and wetland carbon experts to independently verify the outcomes of wetland restoration. While the studies were conducted over short time frames, the impacts of restoration were obvious:

1. Soil health including organic carbon and water-holding capacity was monitored by Deakin Universities Blue Carbon lab, who found that rewetting these degraded wetlands cut carbon emissions by 28–84% within one month of restoration.
2. Aurthur Rylah Institute (ARI) monitored vegetation cover and diversity response in the restored wetlands. They found that after only one year, the environmental watering and revegetation had restored wetlands so they supported an abundance of diverse water-tolerant vegetation, including several endangered plants.

For more information

See www.wetlandrevivaltrust.org for more information.

If you would like to support wetland restoration projects on private and public land, donate at www.wetlandrevivaltrust.org/donate.



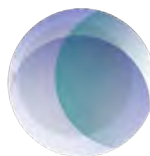
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Wetland Revival Trust would like to acknowledge the people of the Barapa Barapa, Wemba Wemba, Yorta Yorta and Dja Dja Wurrung First Nations who were employed during the Future Drought Fund, 'Boosting drought resilience in the Lower Loddon landscape' project for advice, seed collection, planting and weed-control works.



Australian Government
 Department of Agriculture,
 Water and the Environment



**Future
 Drought
 Fund**

**The Future Drought
 Fund supported the WRT
 project: 'Boosting drought
 resilience in the Lower
 Loddon Landscape'.**

